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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/077,601	02/15/2002	Pengfei Wu	301962.3000-100	1545
207	7590	04/22/2005	EXAMINER	
WEINGARTEN, SCHURGIN, GAGNEBIN & LEOVICI LLP TEN POST OFFICE SQUARE BOSTON, MA 02109			ANGEBRANDT, MARTIN J	
			ART UNIT	PAPER NUMBER
			1756	
DATE MAILED: 04/22/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/077,601

Applicant(s)

WU ET AL.

Examiner

Martin J. Angebrannndt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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1. The response of the applicant has been read and given careful consideration. Responses to the arguments of the applicant are presented after the first rejection to which they are directed.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

“the wavelength band” lacks antecedent basis.

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4 and 6 and 28-32 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Toth et al. WO 00/33142.

Toth et al. WO 00/33142 teaches a holographic recording layer comprising side chain azobenzene polymers and their use in polarization holography with recording using blue or green light and readout using red light. (7/5-22).

The absorption bands are inherent to the azo dye in the polymer chain, as is the functionality in being able to record information using polarized light. The applicant apparently fails to appreciate the azo group in the side chain.

The examiner notes that the exemplified compositions used azo **doped polymers**, rather than polymers with azo sidechains [0032,0041]. The examiner also notes that the use of a polarized blue beam (442 nm) and a pair of red polarized beams (647 nm) are used to simultaneously irradiate the azo doped polyvinylalcohol to record the holographic image [0027,0039 and 0035 in prepub].

7. Claims 1-4, 6-7 and 28-32 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Rao et al. '525.

Rao et al. '525 teach a holographic recording layer using two light sources with respect to figure 5. The use of various photochromic materials including azo dyes is disclosed. (6/54-60). The blue and red lasers are used in the recording process. (13/33-44).

The rejection stands for the reasons above without further comment as no substantive arguments were directed at this rejection.

8. Claims 1-7 and 28-32 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Natansohn et al. '381.

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Natansohn et al. '381 teach a holographic recording layer and recording information on the layer using linearly polarized light (7/38-8/12). The use of various photochromic materials including azo sidechain polymers is disclosed throughout.

With respect to claim 7, the functionality of the two wavelengths is not recited, therefore coupling for readout or writing meets the limitations.

The rejection stands for the reasons above without further comment as no substantive arguments were directed at this rejection.

9. Claims 1-7 and 28-32 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Savant et al. '221.

Savant et al. '221 teach a holographic recording layer and recording information on the layer using linearly or circularly polarized light. (7/38-8/12). The use of various photochromic materials including azo sidechain polymers and guest host systems with the azo dye dispersed in the polymeric matrix are disclosed (4/55-5/20 and 6/65-7/11). See example III and XIII-XX. Various manipulations of the polarization are taught (25/58-26/5). The use of different wavelengths (wavelength/color multiplexing) is disclosed. (26/35-44). Methyl orange (4-[4-(dimethylamino)-phenylazo]benzenesulfonic acid, sodium salt) is disclosed in column 10. 4% Ethyl orange in polyvinyl alcohol is used in examples I-IV.

The rejection stands for the reasons above without further comment as no substantive arguments were directed at this rejection. The examiner notes that methyl orange is the same dyes as exemplified in the instant application, where it is also present in a polyvinylalcohol matrix.

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10. Claims 1-11 and 23-25 and 28-32 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Ishii et al. JP 2000-293849 (machine translation attached).

Ishii et al. JP 2000-293849 records plural holograms by modulating the polarization of the object beam (between s and p) (signal beam) so that adjacent areas have different types of holograms formed in them (figure 6 and 0018-0021, 0040-0051]. The technique uses azo containing polymers in the example (figure 2, 0040-0051)

The examiner holds that the light from each of the different pixel elements meets the limitation of first and second coherent light source, noting that the light emanating from these is coherent and the polarization is defined by them. They are apparent light sources with different polarization. The examiner notes that in claims 7 and 23, the light of different polarization does not have to be of different wavelengths, nor does the light have to be incident upon the same portion of the recording medium. In the holographic embodiments, the polarization of only one of the beams seems to be defined, which embrace polarization holograms which have different polarizations for the reference and object beams and conventional intensity holograms where these beams have the same polarization. The applicant may wish to include these limitations and/or specify the polarization of each beam to narrow the issues. The applicant should also point to the portion of the specification relied upon for this amendment.

The rejection stands for the reasons above without further comment as no substantive arguments were directed at this rejection.

11. Claims 7,12,14,16-21 and 28-32 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kawakubo et al. JP 62-165751.

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Kawakubo et al. JP 62-165751 teaches Langmuir Blodgett (LB) films (monolayers) where the recording layers have sensitivity to different wavelengths and/or polarizations. When recording at least one of these is changed to multiplex information in the recording medium.

The examiner notes that the materials used by Kawakubo et al. JP 62-165751 are not polymeric or azo compounds. The examiner also notes that the light of different polarizations and/or wavelengths activate different layers in the recording media. The examiner does not have a translation of this document (a machine translation is not available). If the applicant has a translation made, the examiner would appreciate a copy with the subsequent response. The examiner holds that as plural irradiation steps with specific polarizations are disclosed (ie three or more) the preilluminating step is met as the result of the preexposure is not set forth in the claims to preclude merely being additional recording steps. If the preexposure is meant to initialize the medium into the same state, the claims should recite this. The applicant should also point to the portion of the specification relied upon for this amendment.

It is not clear if the combination of different wavelength and polarization is used in the examiner as a translation is not present in the record. The examiner holds that the examples exemplifies this and anticipates the claims, or alternatively it would have been obvious to one skilled in the art to vary both wavelength and polarization.

The rejection stands for the reasons above without further comment as no substantive arguments were directed at this rejection.

12. Claims 1-12, 14-22 and 28-32 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Fei et al. "Biphoton holographic storage in methyl orange and ethyl orange dyes", Opt. Lett., Vol. 19(6) pp. 411-413 (03/1994).

Methyl orange or ethyl orange are dissolved/dispersed in polyvinyl alcohol matrices as discussed in the left column on page 411, coated as films and holograms recorded using an arbitrarily polarized 514.5 nm (green) Ar ion laser beam and two vertically polarized HeNe writing beams (632.8 nm, red) to use a two photon (biphotonic) process for recording these holograms. The hologram is read using a low power HeNe beam. (1/5 the power of the writing beams). The argon ion is turned on first, then the HeNe lasers, and then the argon ion laser is turned off (figure 2). The decays are on the order of tens of seconds. The benefits of the pre-exposure is shown with respect to figure 2.

With respect to claim 12, the examiner notes that the storage system is recited to be non-volatile. The applicant should move this inside the body of the claims to clearly indicate that the resulting information is stored so as to be non-volatile.

With respect to the limitation of claim 14, the applicant likely means for the polarization, not the actual beams to be oriented orthogonal to each other. The claims has been read broadly to embrace either, although for the film being planar, the orientation of the beams almost requires one to be incident upon the film from the side.

Please note that the composition of the recording layer is identical to that disclosed.

13. Claims 1-11 and 16-32 are rejected under 35 U.S.C. 102(a) as being fully anticipated by Jager et al., "Bicolor surface reliefs in azobenzene side chain polymers", Appl. Opt., Vol. 40(11) pp. 1776-1778 (04-2001).

Jager et al., teach polymer compositions with side chain polymers having the chemical structure shown in figure 1, which are coated on a glass slide and two s-polarized red laser beams (645 nm) were used together with a blue (488 nm) laser which was either p or s polarized. This

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grating is disclosed with respect to figure 3 as being stable for several days. (page 1777). The effects of the differently polarized light are shown in figure 4.

14. Claims 1-11 and 16-32 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Wu et al., "Transient biphotonic holographic grating in photoisomerizative azo materials", Phys. Rev. B, Vol. 57(7) pp. 3874-3880 (02/1998).

Wu et al., teach PMMA/methyl yellow or ethyl orange/polyvinyl alcohol polymer compositions formed as coatings. (right column, 3876). An experiment is conducted where the 488 nm line of an Argon ion laser was either s, p or circularly polarized and the writing and probe HeNe laser beams are all s polarized. Figure 7 shows that the decay in diffraction efficiency is slow, on the order of minutes (600+ seconds).

15. Claims 1-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fei et al. "Biphoton holographic storage in methyl orange and ethyl orange dyes", Opt. Lett., Vol. 19(6) pp. 411-413 and Wu et al., "Transient biphotonic holographic grating in photoisomerizative azo materials", Phys. Rev. B, Vol. 57(7) pp. 3874-3880.

It would have been obvious to one skilled in the art to modify the process of Fei et al. "Biphoton holographic storage in methyl orange and ethyl orange dyes", Opt. Lett., Vol. 19(6) pp. 411-413 cited, by controlling the polarization as shown by Wu et al., "Transient biphotonic holographic grating in photoisomerizative azo materials", Phys. Rev. B, Vol. 57(7) pp. 3874-3880 with a reasonable expectation of gaining in the duration of the grating lifetime and/or alternatively it would have been obvious to modify the process of Wu et al., "Transient biphotonic holographic grating in photoisomerizative azo materials", Phys. Rev. B, Vol. 57(7) pp. 3874-3880 cited, by turning the argon ion laser on earlier to facilitate a pre-exposure as

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taught by Fei et al. "Biphoton holographic storage in methyl orange and ethyl orange dyes", Opt. Lett., Vol. 19(6) pp. 411-413 with a reasonable expectation of gaining the advantages ascribed to this by Fei et al. "Biphoton holographic storage in methyl orange and ethyl orange dyes", Opt. Lett., Vol. 19(6) pp. 411-413

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wu et al., 'Image storage based upon biphotonic holography in azo/polymer system', Appl. Phys. Lett., Vol. 72(4) pp. 418-420 (01/1998), Sanchez et al., 'Biphotonic holographic gratings in azo benzenes polyesters' surface relief phenomena and polarization effects', Appl. Phys. Lett. Vol. 77(10) pp. 1440-1442 (09/2000) and Wu et al., 'Biphotonic self diffraction in azo-

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doped polymer film' Appl. Phys. Lett. Vol. 70(10) pp. 1224-1226 teach biphotonic holographic recording in azo doped polymer films using a xenon arc lamp and polarized HeNe lasers

Bach et al., 'Biphoton-induced refractive index change in 4-amino-4'-nitrobenzene/polycarbonate', J. Chem. Phys., Vol. 100(10) pp 4135-4140 teaches biphotonic recording in azo doped polycarbonate using the 488 nm line of an Ar ion laser and HeNe lasers.

"The Merck Index", tenth Ed. (1983) p 874 establishes that Methyl orange is 4-[4-(dimethylamino)-phenylazo]benzenesulfonic acid, sodium salt.

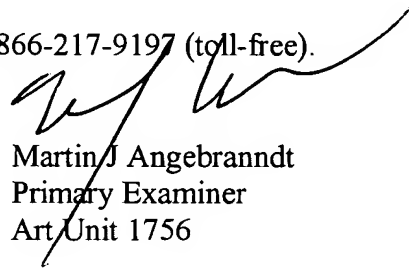
Wu et al., 'Spatial light modulation with an azobenzene-doped polymer by use of biphotonic holography', Opt. Lett. Vol. 24(12) p. 841-843 (06/1999) and Wu et al., 'Transient optical modulation with a disperse red-1- doped polymer film', Appl.Opt. Vol. 39(5) pp 814-817 (02/2000) teach biphotonic recording in azo doped polycarbonate using the 442 nm line of and HeCd laser and 647 nm of a Kr ion laser.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebrannt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Martin J Angebrannndt
Primary Examiner
Art Unit 1756

04/05/2005